LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Sept. 17-21, 2012

WHOA NESSIE

Where did Nessie come from?

Nessie, otherwise known as the Loch Ness Monster, may have come from the sea.

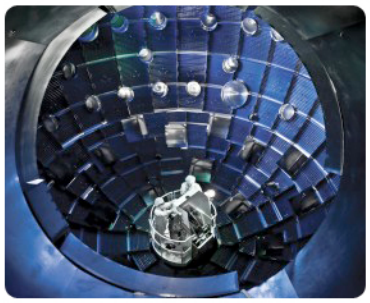
An edition of the History Channel's "Monster Quest" show features researcher Tom Guilderson of LLNL's Center for Accelerator Mass Spectrometry who discusses how a shell found at the bottom of Loch Ness dates back 14,100 years ago.

The conclusion: One of history's most infamous creatures, Nessie, could have originated in the sea during the end of the last Ice Age and swam into Loch Ness when the glaciers retreated.

Guilderson used carbon dating, which determines the isotopic composition of substances, to determine their age.

To see a portion of the "Monster Quest" episode, go to the History Channel.

BIG SCIENCE



Inside the National Ignition Facility target chamber.

America is faced with a long-term challenge of how to power the economy. While there is a boom in domestic production of fossil fuels, that won't meet the growing long-term demand for energy.

One option is fusion energy, which is more secure, safe, economical and sustainable than anything out there today.

Lawrence Livermore is working on a breakthrough in fusion science at the National Ignition Facility. NIF is 'big science' at its very best. It was completed in 2009 and is about three football fields long. It consists of 192 of the largest, most powerful lasers in the world. These lasers are all focused inside a special chamber upon a target that is no larger than a pencil's eraser. When fired, these lasers can create some of the hottest, densest conditions anywhere in the universe.

NIF is the central part of the National Ignition Campaign, a nationwide collaboration with some of the nation's leading scientific institutions that is attempting to demonstrate fusion "ignition" -- the point at which a self-sustained fusion reaction is achieved.

To read more, go to American Security Project.

CBS NEWS **BLOWING IN THE WIND**

Windmills in California.

There is enough wind in the upper atmosphere to meet the nation's energy needs, not to mention the world's.

That's the result of a recent study led by Lawrence Livermore's Kate Marvel. The report stated that the estimated amount of power than can be produced from both near-surface and high-altitude winds is extremely large.

The team found that wind turbines placed on the earth's surface could extract kinetic energy at a rate of at least 400 terawatts, while high-altitude wind power could extract more than 1,800 terawatts. Current total global power demand is about 18 terawatts.

At the level of global energy demand, wind turbines might affect surface temperatures by about 0.2 degrees Fahrenheit and affect precipitation by about 1 percent. Overall, the environmental impacts would not be substantial.

To read more, go to CBS News.

DOE Pulse

SURFING THE PIPELINE

Teacher Michael Sana instructs his students Kahealani Uehara (left) and Jennica Ramones as they conduct their laboratory experience on gene-sequencing at ETEC this summer.

Michael Sana hopes that his students will be as passionate about science as he is.

As a biological science teacher and department head at Waipahu High School on the island of Oahu, Hawaii, Sana looks for ways to build partnerships that could help bring more Hawaiian students into the science pipeline.

Sana was first introduced to the Science Education Program at Lawrence Livermore and the Teacher Research Academy in 2007. While at a professional development conference, he met

Kirk Brown, a former science teacher at Tracy High and currently director of the San Joaquin County Office of Education's Science and Special Projects. Brown, a longtime advocate and participant of the Lab's teacher education programs, encouraged Sana to apply to one of the academies.

Since then, Sana has spent many weeks each summer at the Lab's Edward Teller Education Center (ETEC) and with Lab scientists studying biotechnology research. In fact, two of his students are surfing on his coattails when earlier this summer they completed a two-week session in collaboration with the LLNL Student Scholars Program and the Waksman Institute at Rutgers University.

To read more, go to DOE Pulse.

HAS ENERGY, WILL TRAVEL

Susana Reyes

For Susana Reyes, there really was no other place she wanted to go.

She was initially drawn to Lawrence Livermore during one of her New Energy Technologies classes while completing her master's in power engineering in Madrid. She says: "Then I really got fascinated by the promise of laser fusion as a clean, safe and unlimited energy source for the future generations."

She recently earned the 2012 recipient of the American Nuclear Society Mary Jane Oestmann Professional Women's Achievement Award. In addition to receiving this prestigious award, Reyes has had a dynamic career taking her around the globe.

Reyes serves as vice-chair of the ANS Fusion Energy Division. The award recognizes her "leadership in developing detailed hazard and safety analyses for both inertial and magnetic fusion facilities, including NIF and ITER, and future power reactors." The award is given

annually for outstanding personal dedication and technical achievement by a woman in the fields of nuclear science, engineering, research or education.

To read more, go to the Web

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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